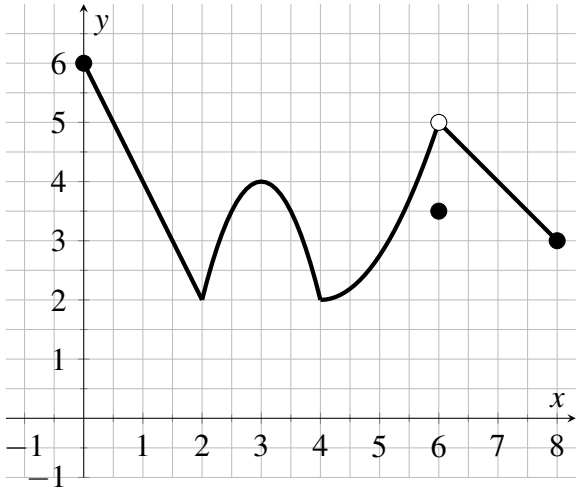
Name: _____ _____ **/ 25**

25 points possible. No aids (book, calculator, etc.) are permitted. You need not simplify, but show all work and use proper notation for full credit.

1. [4 points] Use the graph to determine all the absolute and local maximum and minimum values of the function. If a value does not exist, write DNE.

	y-value	**occurs at $x =$**
local max (list all)		
local min (list all)		
absolute max		
absolute min		



2. [7 points] Find the absolute maximum and absolute minimum values of

$$f(x) = x^3 + 3x^2 - 9x - 3$$

on the interval $[0,3]$, and the x-values where they occur.

Absolute Maximum: $y =$ _____ at $x =$ _____

Absolute Minimum: $y =$ _____ at $x =$ _____

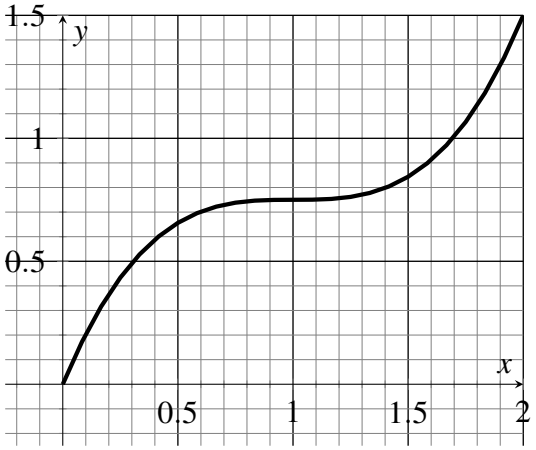
3. [8 points]

Consider the function $f(x)$ shown on the graph below, on the interval $[0,2]$. It has the property that $f(0) = 0$ and $f(2) = \frac{3}{2}$.

a. Fill in the blanks: The function $f(x)$ satisfies the hypotheses of the Mean Value Theorem, which means that $f(x)$ is _____ and _____ .

b. What can we conclude about the function $f(x)$, by the Mean Value Theorem? (That is, state the conclusion of the Mean Value Theorem, specified to this function.)

c. The graph of $f(x)$ is shown below. Add lines to the graph to illustrate what the Mean Value Theorem says about this function. Then use the the graph to estimate the value(s) of c whose existence is predicted by the Mean Value Theorem.



Estimated value(s) (to the nearest tenth) of c predicted by MVT (list all): _____

4. [6 points] Find the critical numbers (critical points) of the function

$$g(x) = \sqrt[3]{x^2 - 9}.$$

Critical points: $x =$ _____